



CALCIUM CARBONATE

Hubercarb® W4 Calcium Carbonate

For Fiberglass Reinforced Polyester Composite Applications

Ground calcium carbonate (GCC) is widely used in fiberglass reinforced polyester composite applications, such as sheet molding compounds (SMC) and bulk molding compounds (BMC), where it functions as a cost-effective extender with positive effects such as lowering viscosity and control of shrinkage while maintaining fiberglass integrity.

Hubercarb® W4 calcium carbonate is milled from a unique micritic limestone ore. This soft and virtually silica-free ore also mills to a more spherical shape than conventional marble sources, which grind to rhombohedral forms. This provides for maximum particle packing and minimizes glass breakage during processing and molding operations.

The Value of Hubercarb W4

FEATURES

- Rounded Particle Shape
- Chalk-Like Softness
- Low Silica Content
- Low Consistent Moisture Content and Re-uptake

PERFORMANCE

- Low Viscosity
- Improved Surface Finish in Molded Parts
- Reduced Part Shrinkage and Glass Breakage
- Reduced Equipment Wear and Lower Maintenance

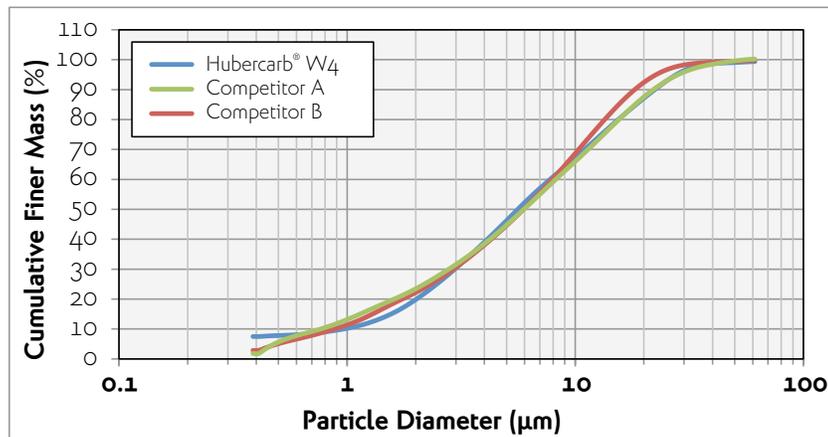
APPLICATIONS

- SMC / BMC Molded Products
- Automotive Body Parts
- Continuous Sheet Production
- Spray and Hand Lay-Up
- Thick Molding Compounds
- Resin Transfer Molding
- Pultrusion



Hubercarb® W4 Versus Its Competition

PARTICLE SIZE AND DISTRIBUTION



The more linear the SediGraph® PSD curve, the better the material packs, allowing for maximum loadings. Hubercarb® W4 calcium carbonate exhibits high linearity.

The above SediGraph® comparison shows the particle size distribution (PSD) of three commonly used GCC products in the composites industry. All three have the same median particle size, but differ in distribution slightly.

PSD influences particle packing: a polydisperse population with a broad size distribution packs more closely than a monodisperse sample. With a polydisperse sample, smaller particles can fill gaps between larger ones and the maximum volume fraction is greater. Increasing the PSD for any given volume fraction of solids will reduce the viscosity of the system. PSD can be a valuable tool for manipulating the viscosity of a system that has a fixed volume fraction.

CHEMICAL ANALYSIS

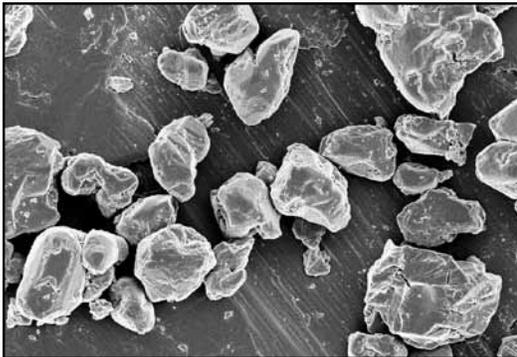
Element	Hubercarb® W4	Competitor A	Competitor B
Leachable Chloride	<5 ppm	29 ppm	15 ppm
Aluminum	25 ppm	81 ppm	50 ppm
Iron	29 ppm	470 ppm	530 ppm
Phosphorus	63 ppm	11 ppm	31 ppm
Lead	<0.5 ppm	0.56 ppm	0.79 ppm
Crystalline Silica	<0.1%	0.5%	<0.1%

Hubercarb® W4 calcium carbonate is one of the purest forms of GCC available. Trace metals like iron can promote undesirable degradation in some polymer systems. Chlorides, in particular, lead to undesirable early viscosity thickening in SMC / BMC systems. Both are noticeably low in concentration in Hubercarb W4 calcium carbonate, which provides processing uniformity in your applications.

Silica is present in all GCC products. Silica is much harder and more abrasive than GCC, which can result in glass fiber breakage. High silica levels also require heightened awareness of occupational nuisance dust control. Hubercarb W4 contains very low levels of crystalline silica.

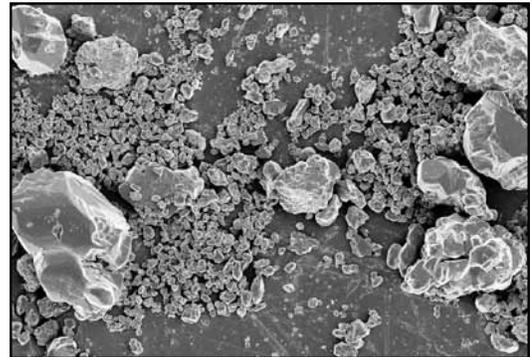
MORPHOLOGY

Hubercarb® W4 (Mag = 5.0 K X)



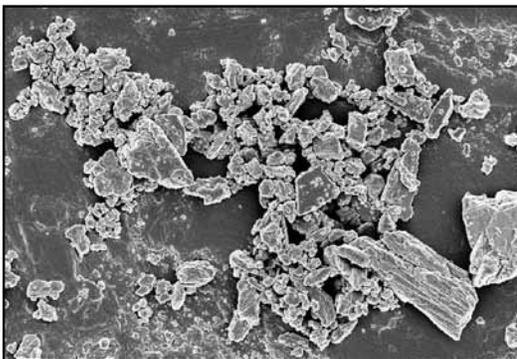
1 µm

Hubercarb® W4 (Mag = 10.0 K X)



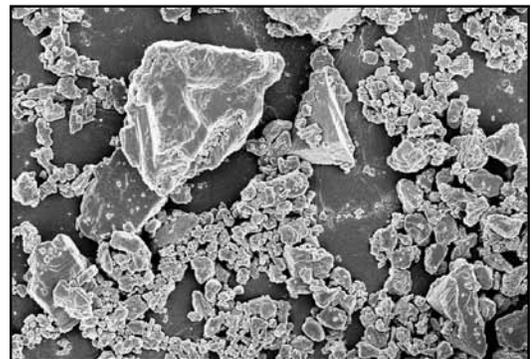
10 µm

Competitor A



1 µm

Competitor B



1 µm

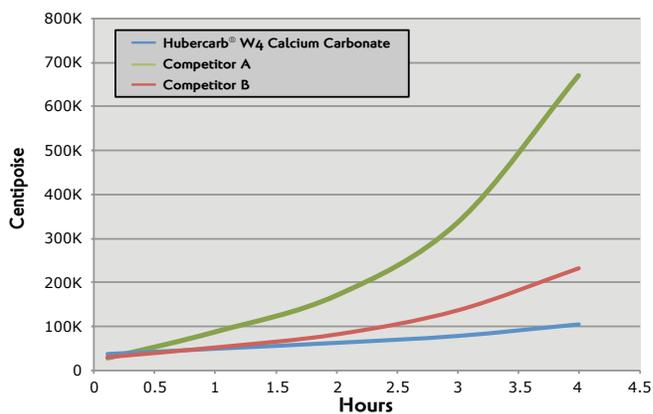
Conventional marble mills to a rhombohedral shape representative of calcite. Look at the micrographs for Competitor A and Competitor B as they illustrate the sharp edges inherent in such crystal forms. In comparison, Hubercarb W4 calcium carbonate is a micritic limestone that mills to a more spherical form with far less sharp edges that can break glass fibers and introduce stress concentration points in the final product.



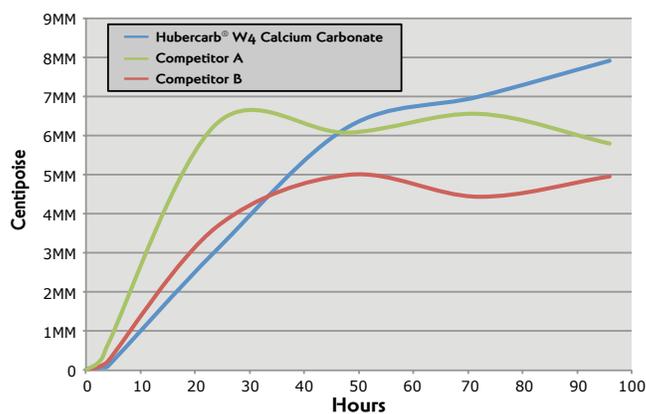
VISCOSITY CONTROL

The beforementioned low chloride levels and optimal particle packing allows for low initial viscosities and controlled maturation while obtaining very high final values.

Thickened Viscosity – First Four Hours



Thickened Viscosity



Moisture Data

Product	Moisture Level (%)
Hubercarb® W4	0.052
Competitor A	0.072
Competitor B	0.078

Another factor in viscosity control is the effect of moisture on cure. Due to its low soluble salt content, Hubercarb® W4 calcium carbonate provides a low and consistent moisture content and re-uptake, providing you a stable platform for your liquid polyesters.



CALCIUM CARBONATE

In addition to an innovative product in Hubercarb W4, Huber Engineered Materials is your calcium carbonate expert with more than 40 years of experience offering product use guidance with sales and technical support and customer service second-to-none. We look forward to working with you. For more information on Hubercarb W4 or to order product samples, contact us today:

Click: hubermaterials.com/w4

Phone: 866-JMHUBER (866-564-8237)

Email: hubermaterials@huber.com

THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Refer to Huber's Standard Conditions of Sale for the only express warranties applicable to the Huber products. Products incorporating Huber products are not warranted by Huber. In no event is Huber liable for consequential damages. Hubercarb® is used, applied for, or registered as a trademark of the J.M. Huber Corporation for calcium carbonate in various countries around the world. SediGraph® is a registered trademark of Micromeritics.
©2013 J.M. Huber Corporation GCC/HubercarbW4/Jan2013